ABSTRACT

RODRÍGUEZ RODRÍGUEZ, Ernesto Alfonso. *Proposal of an optimizer for maximum power point tracking of an array of solar panels connected to a hybrid power system.* 2015. 151f. Dissertation (Master Degree in Electronic Engineering) - Faculty of Engineering, University of the State of Rio de Janeiro (UERJ), Rio de Janeiro, 2015.

This work presents the design and control algorithms of a hybrid power generation system. The system is composed of *Back-to-Back* converters joined to a solar photovoltaic array, which constitutes the dc-link of the converters. The contribution is the development of five algorithms for tracking the maximum power point (MPPT) of the photovoltaic array. The first algorithm is a modified version of the Perturb and Observe (P&O) algorithm; the second proposed algorithm is based on the gradient method (GM); and the third one is based on optimization of GM (OGM). The last two of the proposed algorithms, are based on a Neural Network, which is combined with the P&O and the OGM algorithms, yielding two hybrid algorithms. The system was developed and simulated using Matlab/Simulink, and the simulation by results are presented for the purpose of evaluating the system and the algorithms performance. The response was evaluated during transient and steady-state conditions, by considering different profiles of load power consumption, irradiance and temperature.

Keywords: control algorithms; MPPT; *Back-to-Back*; hybrid energy system; photovoltaic generation system; maximin power point; Perturb and Observe; Gradient Method; Neural Network; hybrid algorithms.